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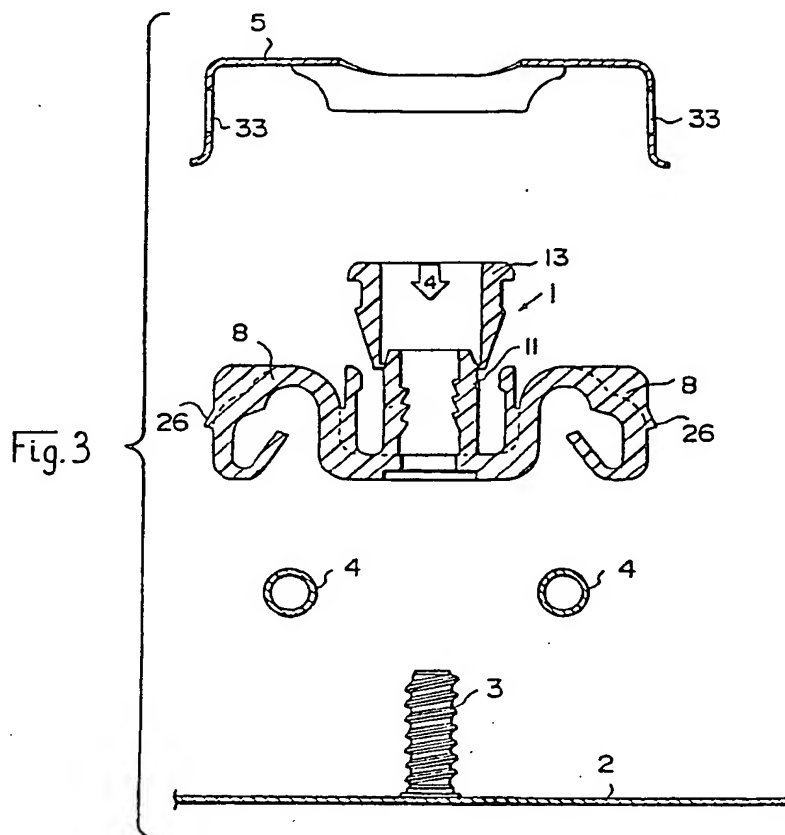
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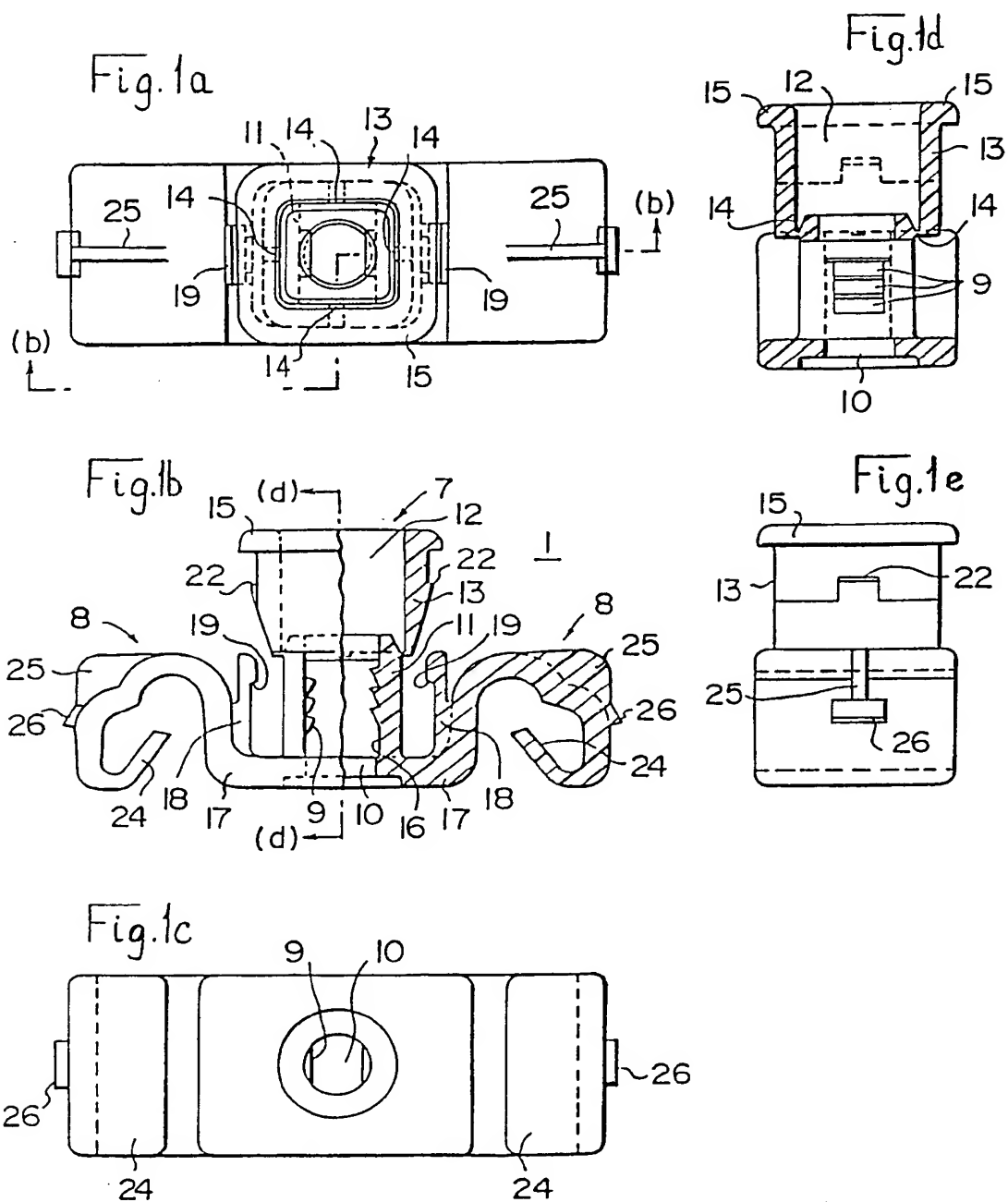
(54) **Plastics fastener**

(57) A plastics fastener, e.g. a clip for securing fuel pipes 4 to a support 2 at the locality of a threaded stud 3 welded to the support, has a resilient sleeve 11 with teeth 9 to engage the stud and a locking sleeve 13 initially joined to the resilient sleeve 11 by a frangible connection 14 and such that, when it is pushed down over the sleeve 11 the sleeve 11 is unable to expand and is therefore firmly restrained on the stud by the teeth 9.



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Fig. 2a

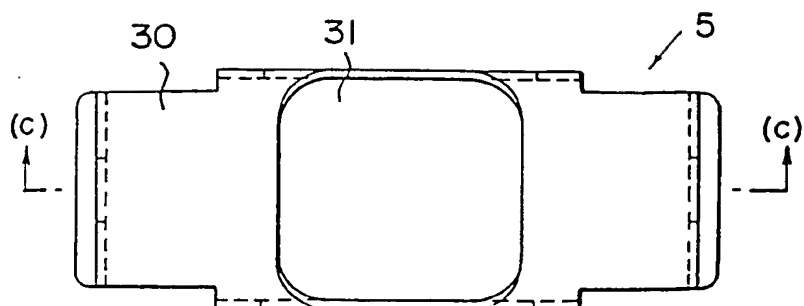


Fig. 2b

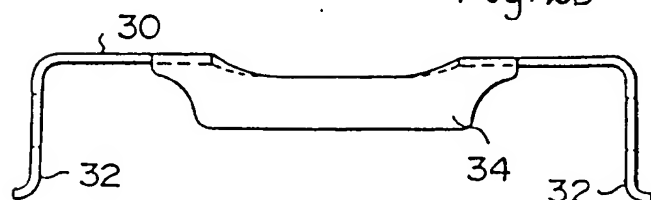


Fig. 2d

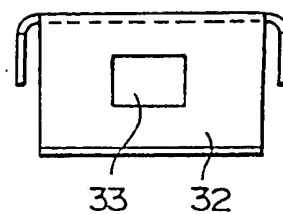
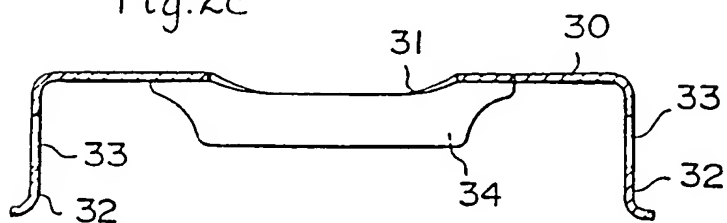


Fig. 2c



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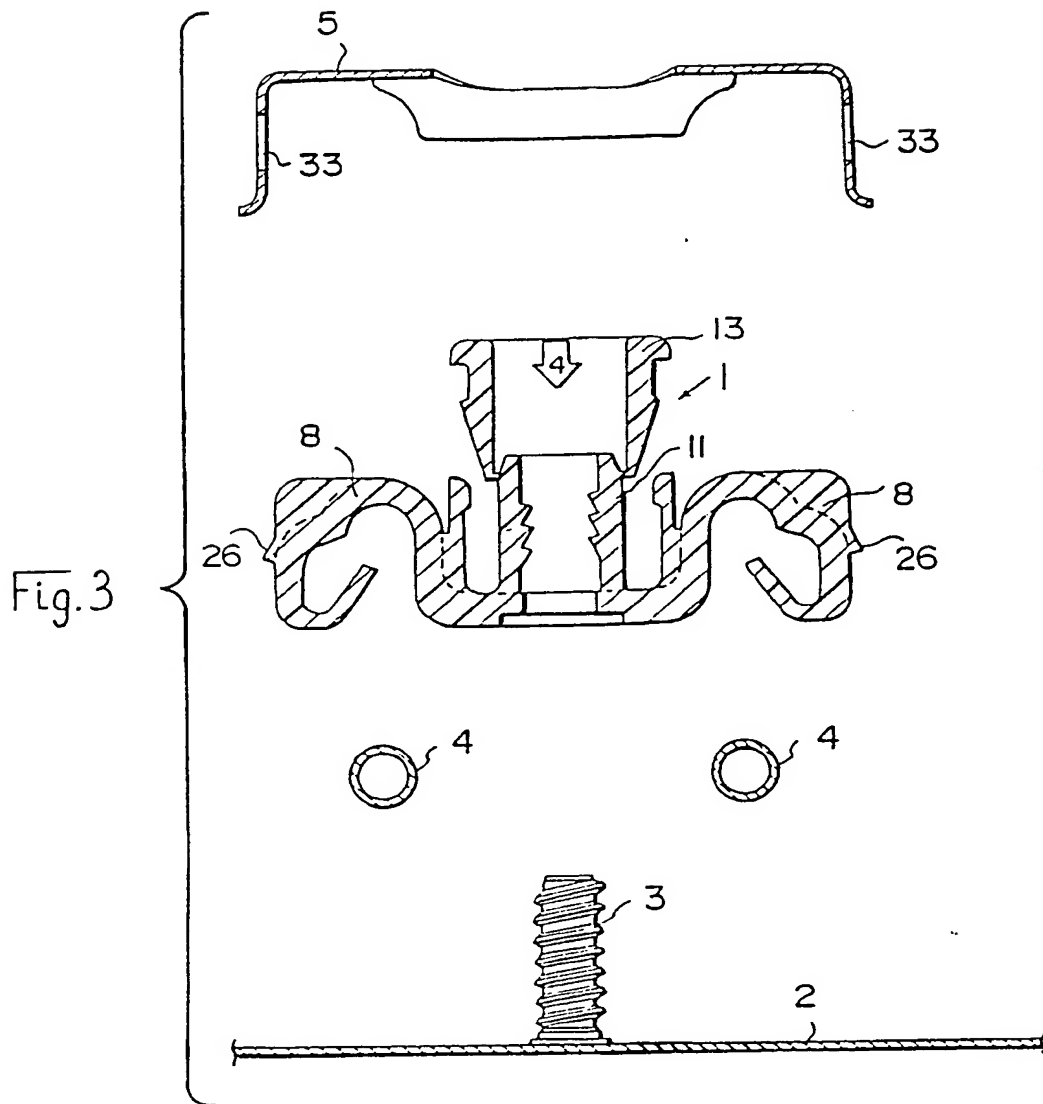
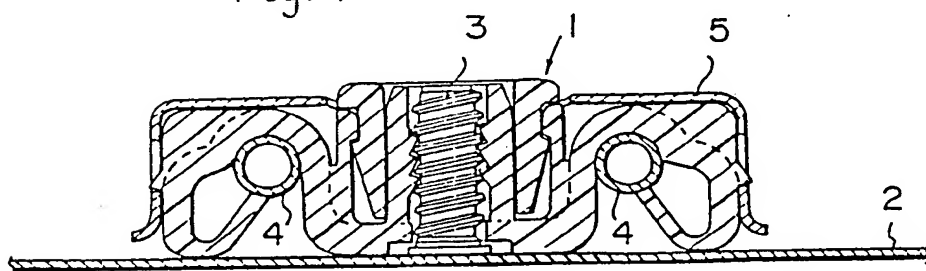


Fig. 4



## SPECIFICATION

## Plastics fastener

5 This invention is concerned with a plastics fastener for attachment to a threaded stud projecting from a support comprising an article-engaging portion for holding an article relative to the support when the clip is attached to the stud, and a stud-receiving portion comprising a sleeve adapted to engage the thread of the stud.

10 A fastener of the kind referred to adapted for use in securing brake fuel pipes to motor vehicles is described, for example, in West German patent specification 3029975. The fastener there described is moulded in one piece of plastics material and has a stud-receiving sleeve which is connected to a base of the fastener by a frangible connection so that after the fastener has been lightly positioned on a stud the sleeve can be pushed towards the support, breaking the connection and firmly anchoring the fastener to the stud.

25 Whereas the aforementioned fastener enables a pipe run to be temporarily assembled on a plurality of studs and adjusted before pushing the sleeves firmly on to the studs for permanent attachment, care needs to be taken to ensure that the dimensions of the moulded fastener fall within narrowly prescribed tolerances to allow this temporary attachment with sufficient retention for practical purposes.

30 It is accordingly an object of the present invention to provide an improved plastics fastener which enables an article to be held lightly in relation to a support and, after necessary adjustment, firmly secured in position.

40 The foregoing objective is achieved in accordance with the invention in that the stud-engaging sleeve is resiliently expandable to allow it to be pushed on to a stud that is upstanding from a base of the fastener, and in that at its end remote from the base the sleeve is initially joined by a frangible connection to a second, locking, sleeve adapted to enclose the stud-engaging sleeve when pushed thereover after the stud-engaging sleeve has been assembled on a stud and thereby to prevent the stud-engaging sleeve expanding sufficiently to release its attachment to the stud.

50 Preferably, in a fastener according to the invention, the frangible connection between the two sleeves is strong enough to remain unbroken when the fastener is assembled on a stud by pushing on the locking sleeve until the stud is fully received within the stud-engaging sleeve. The stud-engaging sleeve preferably has teeth on its inner surface for engagement with the thread of the stud, or other form of protrusion for interlocking with a shoulder or the like on the stud. The sleeves are preferably of square cross-section, and the

locking sleeve may have external shoulders to engage pawls arranged on the fastener to prevent accidental withdrawal of the locking sleeve from the stud-engaging sleeve after it has assumed its locking position.

70 Where the article-engaging portions of the fastener are adapted to receive pipes or electrical wiring harnesses, the pawls for engaging the locking sleeve may project from the article engaging portions. Shoulders may also be provided on outer walls of the article-engaging portions to receive a protective cover which envelopes the fastener as a whole.

80 A fastener in accordance with the invention can be economically moulded in one piece and readily used, for example for attaching pipe and harness runs to the bodies of motor vehicles. Such a fastener can be lightly held in position until adjustment of such a pipe or harness run has been completed and then the permanent fixing readily made by pushing on the locking sleeve.

85 There now follows a description, to be read with reference to the accompanying drawings, of a fastener in accordance with the invention and illustrative thereof. It will be realised that this illustrative fastener has been selected for description by way of example and not of limitation of the invention.

90 In the accompanying drawings:

95 *Figures 1 (a)–(e)* show the illustrative pipe fastener,

*Figure 1a* being a plan view,  
100 *Figure 1b* a sectional view taken along the lines BB of *Fig. 1a*,

*Figure 1c* a bottom view,  
*Figure 1d* a sectional view taken along the line DD of *Fig. 1b*,

*Figure 1e* a right side view;  
105 *Figures 2 (a)–(d)* show a cover to be fitted to the fastener,

*Figure 2a* being a plan view,  
*Figure 2b* a front view,  
*Figure 2c* a sectional view taken along the lines CC of *Fig. 2a*, and

*Figure 2d* a right side view;  
110 *Figure 3* is an exploded view of the illustrative fastener to illustrate its attachment to a stud and

115 *Figure 4* is a view, largely in section, of the illustrative fastener assembled on a stud and holding two pipes in position, the fastener as a whole being enveloped in a protective cover.

120 As shown in *Figs. 1 (a)–(e)*, the illustrative pipe fastener comprises a body 7 and pipe holders 8 both of which are integrally made of a suitable plastics material, and thus not liable to generate rust or noise due to the vibration.

125 The fastener is adapted to be covered by a protective cover 5 as shown in *Figs. 2 (a)–(d)*. As shown in *Fig. 4*, the fastener 1 is fixedly attached to a support in the form of a panel 2 through a threaded stud 3 which is welded to the panel of a automobile or the like, the

fastener holding pipes 4 such as fuel pipes or brake fluid pipes.

The illustrative pipe fastener 1 has a pipe holder H on each side of the body 7, and the body 7 includes an inner, stud engaging, cylinder 11 having a hole 10 formed with teeth 9 which can engage the thread of the stud 3, and an outer, locking, sleeve 13 having a hole 12 capable of enclosing the inner sleeve 11. The inner sleeve is resiliently extensible to allow it to be pushed on to the stud 3, and relaxing into a condition in which the teeth are in engagement with the stud thread.

The inner sleeve 11 is connected to the outer sleeve 13 by a flangible connection constituted by thin portions 14 at the upper end of the inner sleeve (i.e. at the end remote from a base 17 from which the inner sleeve is upstanding.) The connection is at the lower end of the outer sleeve so that the outer sleeve does not initially enclose the inner sleeve. The thin portions 14 are provided at four places on the outer periphery of the inner sleeve 11 as shown in Fig. 1a, and preferably they have a connecting strength of a degree such that the portions 14 are not broken when the inner sleeve 11 is pushed over the stud 3 by applying a force to a flange 15 of the outer sleeve 13 to make the teeth 9 ride over the thread of the stud 3 into a temporary relatively loose condition. However, they are broken by further pushing on the flange 15 with a higher force.

To provide for economy of manufacture and sufficient flexibility of the inner sleeve 11, opposite sides of the inner sleeve are open, as indicated at 16 in Fig. 1b, the teeth 9 being formed on the other two sides. It is preferable to select a distance between the teeth 9 facing each other which is equal to or slightly larger than the route diameter of the thread of the stud thereby to obtain easier assembly and a high ultimate securing force. It is also desirable that a hole 10 through the base of the fastener is of a diameter larger than the crest diameter of the spread of the stud to accommodate a weld fillet as well as a flange of the stud 3.

The base 17 of the illustrative fastener from which the inner sleeve 11 is upstanding is preferably made flat at its underside so as to stably sit on the panel two. The respective holders 8 extend this service towards both sides. From the base 17, resiliently flexible pawls 18 stand up in spaces between the respective holders 8 and the inner sleeve 11 and provide engagement pawls 19 which are able to overlap shoulders 22 on the outer sleeve when the locking sleeve is pushed down towards the base 17.

In the illustrative fastener the inner sleeve 11 is square, but in a fastener according to the invention it may be of any suitable shape. With the inner sleeve 11 square, the outer,

cylinder 13 has a square hole with a dimension which is substantially equal to or slightly larger than the inner sleeve. As long as it can enclose the inner sleeve, the outer sleeve can be of any height. In the illustrative fastener, the locking sleeve has a length equal to the height of the inner sleeve 11. The top surface of the locking sleeve is formed with the flange 15 projecting outwardly so as to be pushed easily by a finger or a hand and to function as a stop at the time of pressing in. As described earlier, the lower end of the locking sleeve 13 is initially connected through the thin portions 14 to the upper end of the inner sleeve 11 so that the outer sleeve does not impose the inner sleeve 11. Upon pushing the flange 15 and the outer sleeve 13 strongly, the outer sleeve 13 descends so as to enclose the inner sleeve and come into the gap between the pawls 18 and the inner sleeve 11. The engagement shoulders 22 formed on the side surfaces of the outer sleeve are then able to interlock with the shoulders 19 of the pawls 18 when the outer sleeve 13 is completely pressed in and enclosing the inner sleeve 11.

The pipe holders 8 are provided, one on each side of the body 7, each of holders being adapted to fasten a pipe 4. An opening of each holder 8 for holding the pipe faces downwardly, i.e. towards the support or panel 2. The opening is narrow at the inlet portion, and an inner portion thereof is widened to fasten the pipe 4. A resiliently flexible finger 24 defining each opening functions as a stop to prevent the inserted pipe 4 from slipping out of the opening. It is preferred that a side (the upper portion in Fig. 1b) opposite to the inlet portion of the pipe holder 8 is made thin for reducing the weight and economising in material, and that it is reinforced by a rib 25 provided at the centre thereof. On the outer side of each pipe holder 8, the protrusion 26 is formed beneath the rib 25 so as to be able to engage the protective cover 5 shown in Figs. 2 (a)-(d).

The protective cover 5 is of metal and functions to cover the upper surface and both sides of the fastener 1, thus enveloping it as a whole. An upper surface 30 of the cover 5 is formed with an opening 31 of a size to receive the flange 15 of the outer sleeve 13 of the fastener. Side walls 32 hang downwardly from the upper surface, and the walls are formed with holes 33 for engaging with the protrusions 26 formed on the sides of the pipe holders 8. Further, a guide 34 hanging downwardly is formed at the side edge of the portion of the upper surface 30 where the opening 31 is formed, for reinforcing the upper surface as well as guiding the fastener 1. The cover 5, is, of course, dispensable if it is not required for use with the illustrative fastener; where it is used, it is assembled on the fastener before the pipes are introduced to

the pipe receiving portions 8 and before the fastener is assembled on a panel.

In use, as indicated in Fig. 3, and after assembling the cover 5 if the cover is to be used, two pipes 4 are introduced into the portions 18. The fastener is then assembled over the stud 3 welded to the panel 2 and lightly attached by pushing on the outer sleeve 13, but without breaking the thin portions 14. When the pipe run has been completed and the assembly is ready for permanent fixing, greater force is applied to the flange 15 of the outer sleeve 13, which is pushed home until the shoulders 22 lock beneath the shoulders 19 of the pawls 18. The locking sleeve 13 thus prevents the inner sleeve 17 from expanding radially and thus prevents accidental detachment of the teeth 19 from the thread of the stud.

In using the illustrative fastener, no risk of rust or undesirable noise is introduced nor any risk of the fastener working loose under conditions of vibration. If the cover 5 is also used, there is little risk of damage.

#### CLAIMS

1 A plastics fastener for attachment to a threaded stud projecting from a support comprising an article-engaging portion for holding an article relative to the support when the clip is attached to the stud, and a stud-receiving portion comprising a sleeve adapted to engage the thread of the stud characterised in that the stud-engaging sleeve (11) is resiliently expansible to allow it to be pushed on to a stud (3) and is upstanding from a base (17) of the fastener, and in that at its end remote from the base the sleeve (11) is initially joined by a frangible connection (14) to a second, locking, sleeve (13) adapted to enclose the stud engaging sleeve (11) when pushed thereover after the stud-engaging sleeve has been assembled on a stud and thereby to prevent the stud-engaging sleeve (11) expanding sufficiently to release its attachment to the stud (3).

2. A fastener according to claim 1 further characterised in that said frangible connection (14) is strong enough to remain unbroken when the fastener is assembled on a stud (3) by pushing on said second sleeve (13) until the stud is fully received within the stud-engaging sleeve (11).

3. A fastener according to claim 2 further characterised in that the stud engaging sleeve (11) has teeth (9) on its inner surface for engagement with the thread of a stud (3).

4. A fastener according to claim 3 further characterised in that said sleeves (11, 13) are of square cross-section.

5. A fastener according to claim 4 further characterised in that said locking sleeve (13) has external shoulders (22), and that the fastener has pawls (19) arranged to engage said shoulders (22) and prevent accidental

withdrawal of the locking sleeve (13) from the stud-engaging sleeve (11) after it has assumed its locking position on the stud-engaging sleeve.

6. A fastener according to claim 5 further characterised in that the pawls (19) project from article-engaging portions (8) of the fastener adapted to receive pipes or electrical wiring harnesses.

7. A fastener according to claim 5 further characterised in that shoulders (26) are provided on outer walls of article-engaging portions (8) to receive a protective cover (5) which envelops the fastener.

8. A plastics fastener adapted for attachment to a threaded stud and substantially as hereinbefore described with reference to the accompanying drawings.

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